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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/091,080	03/05/2002	William J. Hunt	57080US002	6723

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EXAMINER	
UHLIR, NIKOLAS J	

ART UNIT	PAPER NUMBER
1773	

DATE MAILED: 03/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/091,080	HUNT ET AL.	
	Examiner	Art Unit	
	Nikolas J. Uhlir	1773	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *12/24/2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to the arguments dated 12/24/2003. Currently, claims 1-19 are pending.

Previous Grounds of Rejection

2. The previous rejection of claims 1-18 as indefinite under 35 U.S.C 112 second paragraph **has been withdrawn** in view of applicant's arguments.

3. The rejection of claims 1-10, and 13-16 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Bruxvoort et al. (US5958794) **is maintained** as set forth in the previous office action dated 8/27/2003.

4. The rejection of claims 11-12 under 35 U.S.C. 103(a) as being unpatentable over Bruxvoort **is maintained** as set forth in the previous office action dated 8/27/2003.

5. The rejection of claims 17-18 under 35 U.S.C. 103(a) as being unpatentable over Bruxvoort in view of Chen et al. (US6048677) **is maintained** as set forth in the prior office action.

New grounds of Rejection

Claim Rejections - 35 USC § 103

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 1-4, and 7-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bruxvoort et al. (US5958794) in view of Kamikubo et al. (US5698618).

8. Though the examiner does not in accede to any of the applicants arguments with respect to the presence of the dispersant in the claimed final product, for the purpose of

this rejection the examiner interprets the instant claims such that the dispersant is required to be in the final product.

9. Claim 1 requires an abrasive article comprising a backing having a major surface; and an abrasive coating on the major surface of the backing comprising at least 20% by weight of a superabrasive particle, wherein the abrasive coating is derived from an abrasive slurry comprising superabrasive particles; a continuous phase; and a dispersant comprising a polymer having a molecular weight >500 and an AV >4.5.

10. With respect to these limitations, Bruxvoort teaches coating a substrate with an abrasive coating, wherein the abrasive coating is comprised of a mixture of abrasive particles and binder precursor. Bruxvoort teaches that in a most preferred embodiment, the abrasive coating is formed from a slurry containing 40-70 parts abrasive particles and 30-60 parts binder precursor (column 23, lines 10-19). The slurry is coated on the substrate after which the slurry is cured (column 49, lines 35-50). Although the applicant's claimed weight % of particles is not expressly taught, it is the examiners position that the abrasive coating formed by coating a solution comprising 40-70 parts particles and 30-60 parts binder precursor meets this limitation. This is due to the fact that the binder precursor will weigh more then the binder in the cured coating, as the binder precursor contains solvents that are evaporated when the coating is applied to the substrate and subsequently cured. Thus, a coating formed from a solution containing 40-70 parts particles with 30-60 parts binder precursor will contain >40-70 parts particles with respect to the cured binder precursor. Suitable abrasive particles include diamond, titania (titanium oxide), and iron oxide (column 19, lines 5-30). These

abrasive particles are considered to be equivalent to applicant's claimed superabrasive particles. Suitable binder precursors include acrylic based resins and melamines (column 23, lines 10-40).

In addition to the above components, Bruxvoort teaches that the abrasive particles may be coated with a surfactant (equivalent to a dispersing agent) (see column 20, line 65-column 21, line 15).

11. However, Bruxvoort fails to teach the use of a dispersing agent having a molecular weight >500 and an AV value >4.5.

12. With respect tot his deficiency, Kamikubo teaches that the dispersability/flocculation resistance of pigments such as iron oxide, titanium oxide etc. in a polymeric binder (such as an acrylic or melamine type binder) is improved through the use of a polymeric dispersant (see column 3, lines 5-10 and 65-67; column 4, lines 1-30; column 5, line 47-column 6, line 17). Suitable polymeric dispersants include commercially available dispersants such as Disperbyk 161 and Solsperse 24000 (column 4, lines 25-30).

13. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize Solsperse 24000 as taught by Kamikubo as the dispersant utilized by Bruxvoort.

14. One would have been motivated to make this modification in lieu of the fact that Bruxvoort teaches that abrasive particles such as titanium oxide and iron oxide can be coated with a dispersing agent to improve their dispersability in acrylic and melamine resins and because Kamikubo teaches that Solsperse 24000 is a suitable dispersant for

improving the dispersability of titanium oxide/iron oxide particles in acrylic/melamine resin.

15. The limitations of claim 1 are met by the combination set forth above. Though the references do not explicitly teach the required molecular weight and AV value, Solsperse 24000 is listed in the instant specification as meeting these requirements.

16. The limitations of claims 2-4 are met as set forth above for claim 1. Solsperse 24000 meets the molecular weight and AV requirements of these claims.

17. Claims 7-10 are met as set forth above for claim 1. Bruxvoort clearly teaches the use of the required amount of particles, the binder precursor, and the formation of a coating comprising a binder.

18. Claims 11-12 require the suprabrasive particles to be diamond having a particle size <2μ. Bruxvoort teaches that suitable abrasive particles include diamond, aluminum oxide, silicon carbide, and other materials (column 19, lines 5-27). Regarding the applicant's particle size limitation. Bruxvoort teaches that the abrasive particles have an average particle diameter from 0.001-50μm (column 18, lines 15-35).

19. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use abrasive diamond particles having an average particle diameter of 0.001μ as the abrasive particles in Bruxvoort as modified by Kamikubo.

20. One would have been motivated to make this modification in light of the fact that Bruxvoort recognizes the equivalency of Diamond abrasive particles to the other materials listed as suitable for use as abrasive particles. One would have utilized 0.001μ

diameter particles in light of the fact that Bruxvoort explicitly teaches that this particle size is suitable.

21. Claims 13 requires essentially the same limitations as claim 1, except that the polymeric dispersant is required to have a molecular weight of >10,000 and an AV >1.0. Kamikubo teaches that the molecular weight and amine value of a polymeric dispersant impacts the stearic hindrance of the dispersant, and thus its dispersion improving effects (see column 4, lines 7-25). Specifically, Kamikubo teaches that if the molecular weight of the polymeric dispersant is <1000, stearic hindrance cannot be exhibited sufficiently, though there is still a possibility of flocculation even if the molecular weight of the polymer dispersant is >100,000 (see column 4, lines 7-13). This effectively states that as the molecular weight of the polymeric dispersant increases, the stearic hindrance also increases. As a result the risk of flocculation decreases. Further, Kamikubo teaches that if the amine value of the dispersant is <10mgKoH/g, the dispersant does not sufficiently interact with the pigment particles, whereas if the amine value is >200mgKoH/g the stearic hindrance effect is reduced (see column 4, lines 25-30). IN view of these teachings, it is clear that the amine value (and thus the AV value) and the molecular weight of a polymeric dispersant is a results effective variable.

22. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to select a polymeric dispersant having a desired amine value and molecular weight so as to achieve a desired balance between stearic hindrance and pigment interaction.

23. Claim 14 requires essentially the same limitations as claim 1, except that the dispersant is required to have a molecular weight >100,000 and an amine value >0. As set forth above, Kamikubo teaches that suitable polymeric dispersants for dispersing similar pigments in similar binders as disclosed by Bruxvoort include commercially available dispersants such as Disperbyk 161 and Solsperse 24000 (column 4, lines 25-30).

24. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize Disperbyk 161 as taught by Kamikubo as the polymeric dispersant in Bruxvoort.

25. One would have been motivated to make this modification in view of the fact that Bruxvoort teaches that abrasive particles such as titanium oxide and iron oxide can be coated with a dispersing agent to improve their dispersability in acrylic and melamine resins and because Kamikubo teaches that Disperbyk 161 is a suitable dispersant for improving the dispersability of titanium oxide/iron oxide particles in acrylic/melamine resin.

26. Though this combination does not explicitly teach the molecular weight and amine value requirements of claim 14, Disperbyk 161 is listed in the instant specification as a polymeric dispersant having the required properties. Thus, these limitations are met.

27. Claim 15 is met as set forth above for claims 13-14 (per the same reasoning that the molecular weight and AV of a polymeric dispersant is a results effective variable).

28. Claims 16-19 are met as set forth above for claim 1.

29. Claims 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bruxvoort further in view of Suzuki (US5998091).

30. Bruxvoort is relied on as set forth above at section 10 of this office action.

31. However, Bruxvoort fails to teach the use of a polymeric dispersant having a molecular weight in the range of 8000-9000 and an AV between 12 and 13, as required by claims 5 and 6.

32. However, Suzuki teaches that suitable polymeric dispersants for dispersing pigments such as TiC and iron oxide in a polymer binder include Solsperse 24000 and EFKA polymer 400 (see column 37, lines 49-57 and column 39, lines 35-68).

33. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize EFKA polymer 400 as taught by Suzuki as the polymeric dispersant utilized by Bruxvoort.

34. One would have been motivated to make this modification in lieu of the fact that Bruxvoort teaches that polymeric dispersants can be added to the composition to improve the dispersability of pigments and because of the teaching in Suzuki that EFKA polymer 400 is a suitable polymeric dispersant for improving the dispersability of similar pigments similar to those utilized by Bruxvoort in a polymeric binder.

35. Though this combination does not explicitly teach the molecular weight and AV values required by claims 5 and 6, it is the examiners position that these limitations are met when EFKA polymer 400 is utilized as the polymeric dispersant. EFKA polymer 400 is a synonym for EFKA 4400, as evidenced by the Internet posting at http://www.rnagardas.com/HMWPD.html (a copy of this web page accompanies this

office action). WFKA 4400 is listed in the instant specification as a dispersant that meets applicant's claim 5 and claim 6 requirements.

Response to Arguments

36. Applicant's arguments filed 12/24/03 have been fully considered but they are not persuasive. In the instant case, the applicant made the following arguments (summarized):

> I. The examiners characterization of the resulting product is in error. The product of the present application contains the dispersant. Dispersants are non-volatile under the conditions utilizes to coat and cure the abrasive coating. For example Solsperse 24000 does not boil but rather decomposes at 250^0 C. Bruxvoort only teaches heating to 115.5^0 C. Thus, the examiners statement is an over-representation.
>
> II. The rejection of claims 17-18 as unpatentable in view of Bruxvoort in view of Chen is not tenable because the examiner provides no motivation to make the suggested substitution. Thus, the examiner has failed to establish a *prima facie* case of obviousness.

37. These arguments are not persuasive. With respect to argument 1, this argument is unpersuasive because it only establishes that one type of polymeric dispersant (solsperse 24000) would remain in the film when the film is processed at conditions similar to those utilized in the instant invention. The instant claims are not limited to solely this dispersant, and the applicant has not shown that all dispersants having the claimed properties will remain be present in the final product. The examiner notes that the bulk of these rejections can be overcome simply by requiring the dispersant to be present in the final product (as is required by new claim 19).

38. Regarding argument 2. The examiner respectfully disagrees. Bruxvoort teaches polymeric dispersants can be added to the coating composition as set forth above. The secondary references cited by the examiner (Chen, Kamikubo, and Suzuki) all teach

polymeric dispersants that are suitable for improving the dispersability of pigments/particles that are similar/identical to those utilized by Bruxvoort in binders that are similar/identical to those disclosed by Bruxvoort. Thus, there is clear motivation to utilize the dispersants taught by the secondary references in the coating composition of Bruxvoort.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nikolas J. Uhlir whose telephone number is 571-272-1517. The examiner can normally be reached on Mon-Fri 7:30 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul J. Thibodeau can be reached on 571-272-1516. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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